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THE IMPORTANCE OF TYPE IN DAIRY CATTLE BREEDING AND MANAGEMENT*

By

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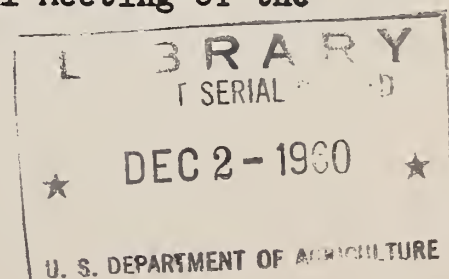
For the past four years our group has been compiling and reviewing the research on the importance of type in dairy cattle breeding and management. In developing the outline for our work we consulted the Type Committee of the American Dairy Science Association. They concurred with us that the subject matter should include the importance of type as related to production, as related to longevity, and as related to merchandizing value. We have also consulted with this same committee in regard to further details of our effort. We appreciate their assistance and willingness to exchange ideas. However, we do not want to imply that they must accept any responsibility for the conclusions which we present here.

Type and Production

The research information regarding the relationship of type and production can be summarized by the examination of two sets of data. In 1957 Rice and his co-authors (13) published the average production of Holstein-Friesian cows having various type classifications. They showed that the Excellent cows averaged 508 pounds of butterfat; and the Very Good cows, 478; Good Plus, 456; the Good, 435; and Fair, 414 pounds. The difference between the average butterfat yield of the Good Plus cows and the Excellent cows in this report was 11.4 percent.

Recent research workers have criticized this method of evaluating the relationship of type and production. They have suggested that the Excellent and Very Good cows were likely to have been kept in herds with better feed

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and management than the Good Plus, Good or Fair cows. Therefore, the production was higher for the cows with high classifications at least partially because of their being better fed and taken care of than the cows with low classification grades. With this in mind several workers have analyzed the relationship between type and production on a within-herd basis; i.e., they compared the type and production of cows kept in the same herd. One of these studies was made in Wisconsin (18), using data from 45,000 Holstein-Friesian cows having HIR records and type classification grades. In this study, based on comparing cows kept in the same herd, the Excellent cows averaged 480 pounds of butterfat, the Very Good's, 465, the Good Plus's, 450; the Good's, 435; and the Fair's, 420. Instead of an 11.4 percent difference between the Good Plus and the Excellent cows, they showed a difference of only 6.7 percent.

Also important to this study on the relation between type and production is the accuracy with which the averages would predict the production of an individual. In the Holstein data analyzed by Wisconsin there is an average difference of 60 pounds of butterfat between the Fair cows and the Excellent cows. However, because of the slight association between type and production, if one were to predict the production of individuals from their type classification, he would, on the average, miss the actual production of these cows by as much as 69 pounds of butterfat. His average error in prediction would be greater than the entire difference between the expected production of Fair and Excellent cows.

Other studies, two of which were conducted by West Virginia workers with Ayrshires (3,19); two in Canada, one with Holsteins (15) and one with Jerseys (12); one in Iowa with Jersey data (5); and one in Illinois with Jersey data, (16) all confirm these findings on the relationship between production and type. We would be remiss, however, if we considered only the final type grade in this discussion. In some of the studies, researchers have found that dairy character has more relation with production than does any other single component of type grade. Some of these workers have estimated not only the association between dairy character and production of the same cow but also the association between dairy character and production of the cow compared to her daughter, i.e., the genetic association. They have found that the genetic association between dairy character and production is very high (6). These results indicate that selection for dairy character alone would result in increasing milk yield about 42 percent as fast as if selection were based directly on single production records. The data show that selection on dairy character would be nearly four times as effective in increasing milk yield as would be selection on final rating. These results further imply that if dairymen desire type ratings to reflect production more closely than they do at present, more emphasis should be put on dairy character.

Two limitations of the usefulness of dairy character as a criterion for production when records are not available should be mentioned. One is the result of different judges having varying definitions of this characteristic. Despite the descriptions as indicated on the score card, many judges consider dairy character as the "general appearance for milkiness". "Milkiness" is a nebulous term encompassing the entire impression given by the appearance of a cow in regard to her ability to milk. This, of course, includes the mammary system. It is also common knowledge that feeding and management affect the evaluation of dairy character in a cow. Highly fed animals tend to show less of this trait than underfed animals with similar production. The variability in evaluating dairy character is indicated by the report of Wilcox and his colleagues in New Jersey (20) that, of the type components, dairy character scores were among the lowest in repeatability. It is also reflected in the low heritability for the characteristic (.06 to .09) reported by Mitchell and co-workers at Wisconsin (6). Careful study to develop an objective definition of dairy character might measurably increase its usefulness for predicting production.

The other limitation in the usefulness of dairy character which should be recognized is in regard to its use as a basis for culling heifers. The studies reported above are computed from observations on lactating cows. There is reason to believe that in judging dairy character in lactating cows attention is given to the development of the mammary system and particularly to the thinness and angularity of the animal resulting from her heavy milk production. Consequently, until further information is available, the possibility has to be admitted that the expression of dairy character in heifers may not be on the same physiological basis as the expression of it in milk cows. This possibility suggests caution in concluding that dairy character is useful for predicting the future production of heifers or in culling them for breeding purposes.

So far we have talked about type as a substitute for production records. In order to be complete and fair the question should also be asked, "Even though type is not an adequate substitute for production records, does it have enough association with production to justify its use as a supplement to production records in estimating the breeding value of cattle"? With some help from Dr. Truman Martin of Purdue, we worked out the increased value of estimating breeding worth through the use of type as a supplement to production records as compared to the use of production records alone. We used dairy character in this evaluation because this was most closely related genetically to production records. Based on the Wisconsin analysis with the Holsteins (6), we found that progress through selection can be increased by only 2 or 3 percent if dairy character is considered along with production records when predicting breeding value for milk yield. If one used final grade as a supplement to production records, the progress through selection for milk yield would be increased by only 0.4 percent. Thus type is not sufficiently related to production to use it as either a substitute or supplement in dairy cattle selection.

In brief, our review of the research information on the relation between type and production shows that the studies using averages over all herds tend to overestimate the relationship because of the environmental contribution to the associations obtained. Recent studies on a within-herd basis have reported low positive associations. To the dairymen this indicates that type is only about one-tenth as effective as a single production record when estimating the breeding value of cows regarding milk and butterfat yield. The type component, dairy character, has some use in estimating current production in lactating cows without records. However, an objective description is urgently needed regarding what should be included in this component. If such a description could be developed, it is possible that the usefulness of dairy character might be improved. It is obvious that if both production and type are desired, selection for one will not markedly improve the other. Improvement in both production and type will require selection for both.

Type and Longevity

Next let us consider the relation of type to longevity. Before we do this we should discuss the nature of longevity in dairy cows and some of the factors influencing it. Longevity in an animal is usually defined as the length of life of that animal. In using it regarding dairy cattle this definition is often qualified to denote the length of the productive life of the cows. We are all acquainted with the importance of longevity as an economic factor in dairy herd management. Shown in Figure 1 is a conventional diagram often used to illustrate this importance. It indicates that an average DHIA cow has to complete her second lactation before she has returned to the owner the amount of money he has invested in her. It is obvious that the longer she stays in the herd and remains productive the more profit she is going to return to the owner.

What are the factors which influence the length of time that a cow may stay in the herd? In Table 1 we have presented the reasons for disposal of cattle in the Department of Agriculture's Holstein-Friesian and Jersey herds at Beltsville (7). In these herds no cows were culled for production or type over a period of 40 years. Therefore, we believe the data are particularly adequate to show the factors affecting longevity. Examination of the table shows that 41.3 percent of the 409 Holsteins were removed from the herd as non-breeders. This is by far the most important reason for disposal. The second largest reason included TB and Brucellosis (Bang's disease) reactors. This can be attributed to serious TB and Bang's outbreaks during the early years of the experimental herd. The next largest reason was udder troubles, 10.5 percent. In the 426 Jerseys, removal as non-breeders was also the single largest reason. Except for disease reactors the second most important reason again was udder troubles.

We next estimated the heritability of longevity. As shown in Table 2, the heritability of longevity found in both the Jersey and Holstein cattle at Beltsville was not significantly different from zero and was very low.

Table 1. Reasons for Disposal of Cattle in USDA Holstein-Friesian and Jersey Herds at Beltsville, Maryland (7)

Item	Percent of total removed	
	Holstein	Jersey
Non-breeders -----	41.3	24.4
Brucellosis reactors -----	3.2	21.6
TB reactors -----	15.2	15.0
Udder troubles -----	10.5	9.6
Infections -----	7.6	7.5
Poor condition -----	3.7	6.6
Died -----	10.3	5.2
Foreign body -----	1.7	1.9
Severe injury -----	0.9	1.2
Slaughter after abortion -----	4.7	1.6
Lump jaw -----	0.5	0.7
Bloat -----	---	0.5
Slaughtered - no reason indicated -----	---	0.5
Undersize -----	0.2	---
Legs -----	0.2	---
Other -----	---	3.7

Table 2. Heritability Estimates (h^2) of Longevity in USDA Holstein-Friesian and Jersey Herds at Beltsville, Maryland (7)

Item	Holstein			Jersey		
	No.	r or b	h^2	No.	r or b	h^2
	Pairs			Pairs		
Intra-sire daughter-dam regression -----	254	.042	.084	277	.025	.050
Paternal half-sib correlation -----	286	.010	.040	341	.028	.112

Figure 1.

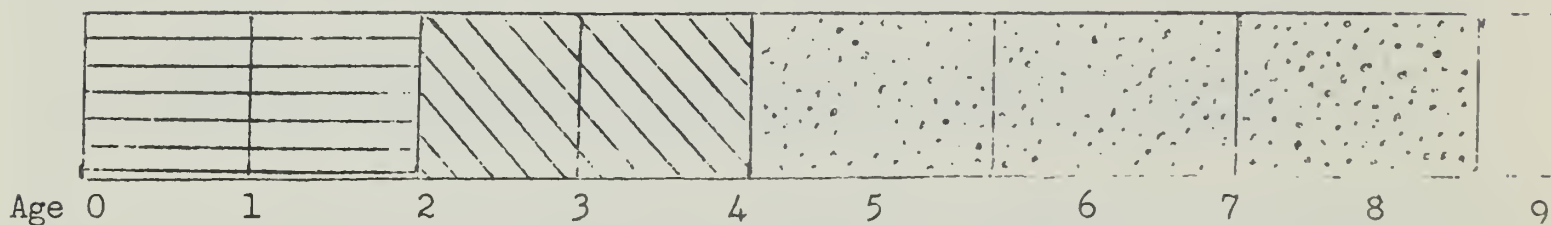
The Cumulative Profit per Year Is
Greater With Old Cows than Young Cows
From Gilmore (4)



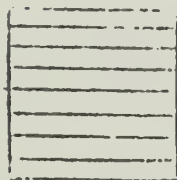
The one lactation cow pays only half of her bills



The average D.H.I.A. cow makes profit for $1\frac{1}{2}$ years



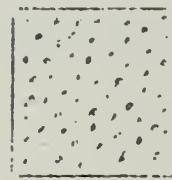
The $8\frac{1}{2}$ Yr. old cows make three times the profit of cows at $5\frac{1}{2}$ yrs.



No income



No net gain



Profit

Some may ask, "Wasn't the heritability of longevity low because of an abnormal situation regarding the high percentage of cattle removed as non-breeders"? We asked ourselves this question. When we searched the literature for an answer, we found that Specht and McGilliard (14) reported in January 1960, that of the cattle in 269 Holstein DHIA herds in Michigan, 15 percent were removed because of sterility. When the cattle removed for dairy purposes and low production were excluded from this analysis, the data showed that 33 percent were removed because of sterility. This suggests that the Beltsville data are not unusual.

Furthermore, in a study which is being reported at this meeting, R. D. Plowman and R. F. Gaalaas (9) of our staff analyzed the data from 79 herds in 17 different States comprising over 3,000 daughter-dam pairs. They found that the heritability of longevity was very close to 0.1. Only in those herds where culling and cow family selection could be expected to affect the estimates were the heritability coefficients of longevity significantly different from zero.

From the information available on the factors influencing longevity it appears that fertility is of greatest importance, udder troubles next and that genetic influences which would respond to selection are of very little importance, if any. The method for improving longevity, therefore, should be based primarily on management practices. These should emphasize udder care and disease and injury prevention as well as careful checking of heats and breeding at the proper time.

The lack of importance of genetic influence on longevity reflects directly on expectations regarding the relationship between dairy type and longevity. There is no reason to believe that selecting dairy cattle for improved type will improve longevity because efforts to improve it genetically through any selection method probably would be ineffective.

There are, however, certain aspects of the physical appearance of cattle which could affect a particular animal's life expectancy. Some of these are obvious: extreme pendulosity of the udder, extrusion of the teats caused by weak suspensory ligaments, evidence of arthritis and other symptoms of illness. Nearly all dairymen have observed udder unsoundness and leg abnormalities in groups of sires' daughters. Young and Legates (22) have reported evidence suggesting there is a slight association between the nearness of the udder floor to the ground and incidence of mastitis in the cow. Unpublished data from Beltsville show that young cows with the deeper udders also tend to be the older cows having the deeper udders. To the extent that the above items of physical appearance may be considered as contributing to dairy type, one might expect the type of an animal to be an indication of her expected longevity. However, it is obvious that if type is to be a reliable indicator of longevity, the existing score card would have to be modified drastically. Probably the most dairymen can do at the present time is to prevent serious unsoundness from reducing the existent length of productive life by eliminating sires whose daughters show obvious evidence of real defects. This effort would be comparable to that now exerted regarding red color in Holsteins and lethal and other abnormalities in all breeds.

Type and Merchandising Value

The third aspect regarding the importance of type in dairy cattle breeding and management is related to the merchandising value of type. That type is important in the sale of registered breeding animals is obvious. It would be desirable to estimate this importance quantitatively by determining the regression of sales price on type score independent of such things as production records, popularity of breeding, suitability of the animal for the current show season and other factors. Adequate data for such a refined analysis do not exist at the present time. However, it is possible to obtain an approximation of the merchandising value of type by compiling data from several sources.

A summary of the auction sales of the Holstein-Friesian breed in 1958 (10) shows that nearly half of the 13,217 animals sold were either classified for type or from classified dams. They averaged \$521. The unclassified animals sold for an average of \$381. Females with production records averaged \$519. Those without records but from dams with records averaged \$462 and those without records and from untested dams \$381. Thus the existence of classification information appears to have been at least as important as the existence of production records. In the summary, cows classified Excellent sold for \$1139, Very Good \$750, Good Plus \$542, Good \$461 and Fair \$369.

An additional illustration of the importance of type in the sales ring is found in the results of the 11th McDonald Farms Guernsey sale held in 1959 (11). Four cows over 2 years of age and classified Excellent averaged \$4500. Five of the same age group but classified Very Good averaged \$1305. There was very little difference in the average production indicated by the lactation records of both groups.

Recognizing that type is probably equally as important as production in the merchandising of purebred cattle, it is then important to estimate the importance of cattle sales to the income of dairymen. To ascertain this in regard to the extremely popular breeders, inquiries were sent to the management of one Holstein-Friesian herd and one Guernsey herd regarding the percentage of income obtained from milk sales and the percentage obtained from cattle sales. The average income from cattle sales in these herds had been more than \$100,000 for a period of 5 years. Both indicated that approximately 50 percent of their income was from milk sales and 50 percent from cattle sales. Under these exceptional circumstances, therefore, (assuming that type and production are equally important in cattle sales), differences in production affected 75 percent of the gross income. Fifty percent was obtained from milk sales and 25 percent from the production records of cattle sold for dairy purposes.

Differences in type affected 25 percent of the sales, therefore the ratio of economic importance of production to type should be 75 to 25 or 3:1 in such herds.

One has to recognize, of course, that more than 95 percent of the cattle in the United States are not purebreds. Studies have been made on 556 dairy farms in New York (1) with reported average receipts from milk sales of \$6,928 per farm. Livestock sales from nearly all dairy cattle amounted to \$877. This combined income totals \$7,805. Other estimates (2) show that 35 percent of the cattle sales on most dairy farms are sold for dairy purposes. Thus the \$877 from cattle sales may be divided into \$307 from sales for dairy purposes and \$570 from sales of veal calves and slaughter of cows.

The \$307 from the sales for dairy purposes represents 3.9 percent of the \$7,805 income. If type were considered equally important as production in these sales for dairy purposes, it can be said that type differences may have affected one-half of the 3.9 or 2 percent of the dairy income of the New York farms. The income resulting from milk production amounts to 90.7 percent of the total. Thus the relative importance of production to type in these herds would be 91 percent of the income affected by production variations and 2 percent influenced by type, or 45:1. Dairy operations analyzed near Detroit, Michigan, (8) showed that in a typical 20 cow herd, the ratio of production's contribution to income as compared to type was 32:1.

Of course it is possible that the dairy animals in the herds in both New York and Michigan were sold without production records. Under such circumstances the sale might be dependent almost entirely upon the physical appearance of the cow. Giving entire credit to type for sales of the animals for dairy purposes makes the ratio of economic importance of differences in production to differences in type in the New York herds, 22:1; and in the Detroit herds, 16:1.

Thus although variation in type unquestionably influences the sale value of cattle, in only the most popular breeding herds can dairymen consider the relative economic value of variation in production to type at less than 3:1. In the majority of herds the ratio probably would be 20:1.

Trimberger (17) has suggested that net income would be a more equitable method for evaluating the importance of type than gross income. When net income is considered for the two large breeding establishments mentioned previously, it is apparent that they would have no net income without cattle sales. On the other hand, it is also apparent that the costs of selling cattle are far more than the mere charges for advertising, sales commissions, etc. These costs involve the employment of more skilled help, the maintenance of more impressive buildings and additional labor in caring for and grooming the cattle than is required on most dairy farms. Such costs are so integrated with other expenses involved in the farm operations that it is practically impossible to precisely separate those attributed to cattle sales or milk sales. It appears nevertheless that cattle sales are of more importance to the net income than milk sales in these extremely popular herds. However, because production contributes to both sources of net income and type only to cattle sales, the ratio of the importance of variation in production to variation in type in these herds on the basis of net income might be less than 3:1 but probably would never equal 1:1. For the great number of purebred breeders production would have considerably more importance in determining

net income than type. In the New York herds, mentioned previously, type influenced 5.6 percent of the net income. Net income information was not derivable from data on the herds in Detroit.

From the data related to this portion of the discussion we can state that the information on the merchandising value of dairy type is far from satisfactory. Nevertheless it lends credibility to the generally accepted belief that cattle buyers today are paying about as much attention to type as to production when making purchases. Cognizance should be taken, however, of the fact that many persons buying breeding stock believe improved type has a close genetic association with improved production and increased longevity. When these persons become aware of the research facts showing the lack of such associations and accept these facts, the importance they give to type in cattle purchases may become considerably less than it is today.

Effect on Progress

Next, let's discuss what the research findings mean in regard to the progress which we can make towards the most profitable dairy cow. There is a basic principle in selection that the greater the number of traits for which selection is made, the less is the progress per generation which is possible for any one trait. This is illustrated in Figure 2. The upper line in this figure shows the genetic progress per year which might be expected in milk yield if we select for milk yield alone. The middle line shows that we reduce the progress regarding milk yield to some extent if we give even slight attention to type. The lower line shows that progress towards increased milk yields would be reduced markedly if type were given more emphasis than milk yield.

These relationships are shown more precisely in Figure 3. The estimates are based on the analysis made at Wisconsin on the Holstein-Friesian data and the analysis made at Illinois on Jersey data. Across the bottom of the graph are shown the varying ratios of importance given to milk yield as compared to type when selecting for both at the same time. For example: 1000:1 represents making 1,000 pounds of milk equivalent in importance to one type grade; 12,000:1 represents 12,000 pounds of milk as equivalent to one type grade, etc.

The points A, B, C, D, and E represent ratios of importance expressed in variation as discussed in the section on merchandising value. Point B represents giving variation in milk yield 3 times the importance as variation in type grade. The reader will notice that a 3:1 ratio in variation for the Holsteins is equivalent to a ratio of about 800:1 in absolute pounds of milk to one type grade.

In the left-hand margin of the figure are the percentages of progress expected. One-hundred percent is the progress expected when selecting for only one trait. For example: following the descending line based on Holstein-Friesian data, at point B the ratio of importance of milk yield to type is 3:1 in

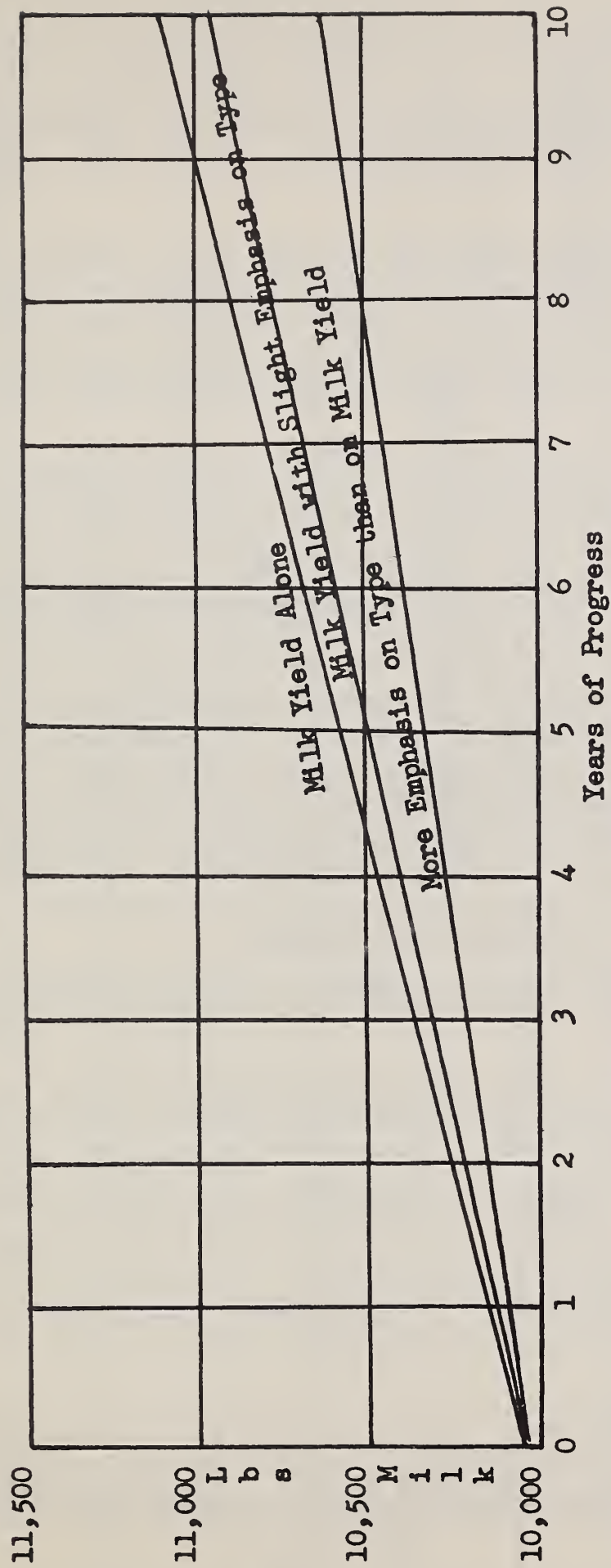


Figure 2. Expected Progress in Milk Yield by Selecting for Milk Yield Alone and Also Selecting for Type

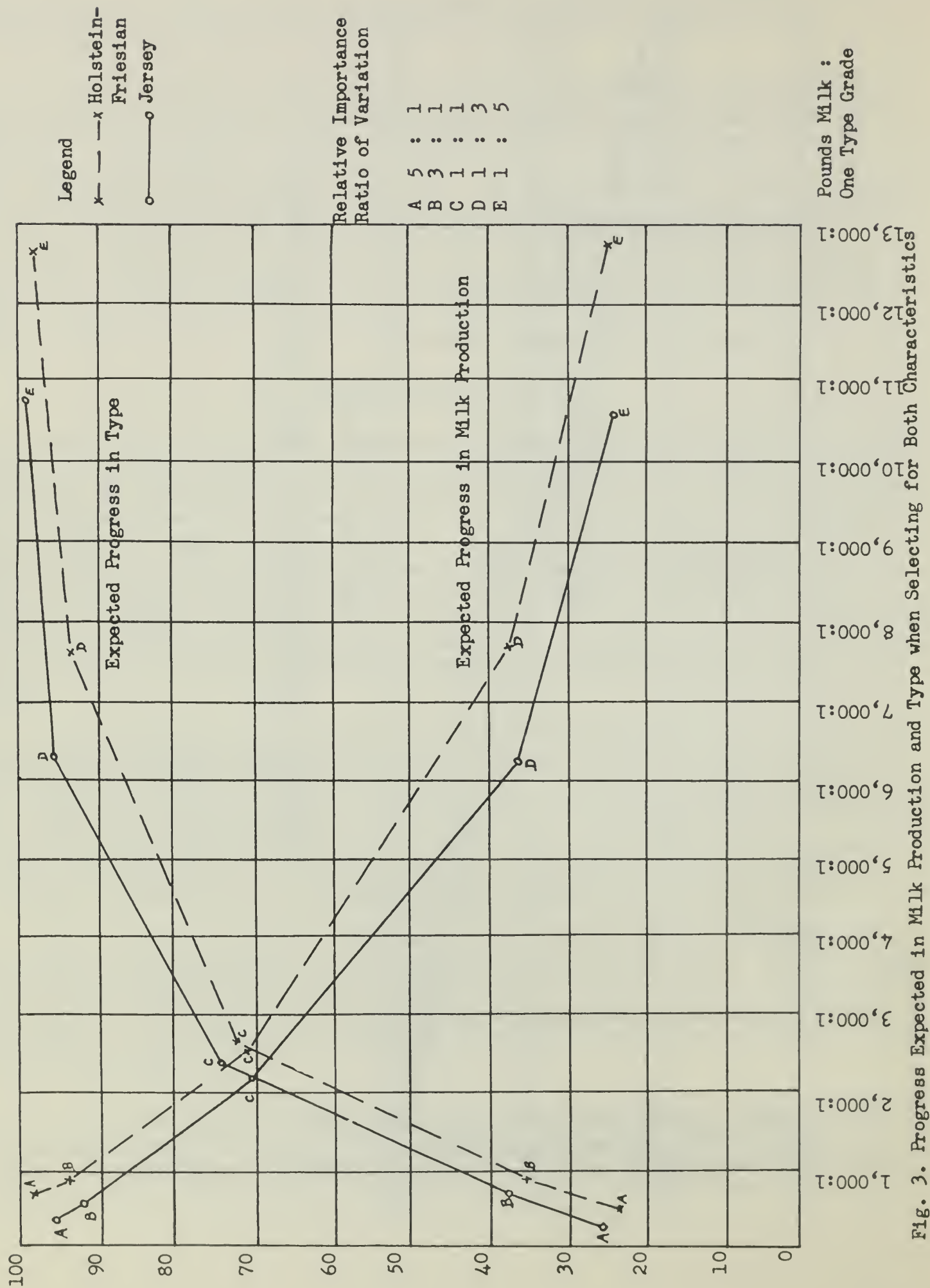


Fig. 3. Progress Expected in Milk Production and Type when Selecting for Both Characteristics

variation or 800:1 in pounds of milk per type grade. With this relative emphasis given to type when selecting for both milk and type, progress in milk yield would be 95 percent as much as if selection were for milk yield without any attention paid to type. Thus if the elite breeders give type the importance justified by its merchandising value based on their gross income, they will not seriously reduce their progress towards increased milk yield.

On the other hand, if one follows the ascending line for the Holstein data, point B shows that with a 3:1 ratio, progress in type would be only 35 percent as great as if selection were for type alone. Obviously, breeders who noticeably improve the type of their cattle are giving more emphasis than the 3:1 ratio justified by merchandising value.

The question then arises: How much emphasis can be given type without seriously reducing progress regarding production? The ascending line on the Holstein data shows that in order to obtain progress in type which is 50 percent or more of the progress expected when selection is made only on type, it would be necessary to make 1,500 pounds of milk equivalent to one type grade. Referring to the descending line, it can be seen that progress for milk yield with this relation of importance would be 14 percent less than if type were not considered at all. It is of importance to note that if type is given as much importance as 2,500 pounds of milk, progress towards higher milk yield would be reduced by 28 percent. The reader will also note that giving a type grade as much importance as 2,500 pounds of milk is nearly equivalent to giving variation in type equal importance to variation in production. The data for Jerseys show similar relationships, particularly when relative importance is expressed in terms of variation.

Summary and Conclusions

Now let's summarize all the findings and state the conclusions which appear appropriate.

The research studies reported during the past two decades have established that there is only a slight association between dairy type as defined on the generally accepted score card and lactation production. Very recent work on longevity has shown that length of productive life in cows is not influenced to a significant extent by selection. Therefore, efforts to improve longevity by selection for type probably would not be effective except for the elimination of sires whose daughters have obviously unsound udders and other severe abnormalities. Furthermore, the major influence on longevity is fertility and this has no known relationship to accepted dairy type.

There is no question but that dairy type is important in determining the price of animals sold for breeding purposes. It is at least as important as production and probably more so to some breeders. However, only a very

small number of dairy farms in this country are dependent for as much as 25 percent of their income on variation in type of their cattle. For more than 95 percent of the dairymen, variations in milk production are at least 20 times as important to their income as are variations in type.

From these considerations of the research findings, the dairymen who have herds ~~that~~ are average or below in production should concentrate on improving management and carry out their selection on production records in order to increase the profit of their herds. They should recognize that type is not a reliable indicator of production phenotypically or genetically. They should realize that the longevity of their cattle is mainly dependent on the care which is furnished. These dairymen should keep in mind that only about 2 to 6 percent of their income may be dependent on variation in type.

Those few dairymen who have succeeded in developing a highly productive herd through management practices and selection on production records will possibly find it necessary to allow one type grade as much emphasis as 1,500 and 1,200 pounds of milk in Holsteins and Jerseys, respectively, if they desire to markedly improve the type of their herds and emphasize cattle sales. In doing so, however, they should realize that their progress regarding improvement of production will be 12 to 15 percent less than if they selected for production alone. If they should desire to give type variations equal importance to variations in production (1:1), they should allow one type grade to be equal in value to about 2,500 pounds of milk for Holsteins and 2,100 pounds for Jerseys. Again they should recognize that their progress towards improved milk yield will be reduced by approximately 29 percent.

Breeders should also recognize that the purpose for improving dairy type is almost entirely one of "prettying up the package in which the milk making machine is housed". It is altogether possible that when more and more dairymen accept this concept of type's importance, the value they will put on type as compared to production when purchasing cattle may become less than it is at the present time.

It is characteristic of many State 4H programs to emphasize three aspects of dairying through somewhat independent activities. The dairy project itself is usually evaluated on the basis of the records kept and the written report by the member. The type of the member's calf is evaluated through show ring competition. Dairy cattle judging is emphasized by contests with even international scope. The results of the research to date give strong support to the programs in those States where there is a trend towards placing more emphasis on the production and management aspects of the dairy project and less emphasis on the type of the animal acquired, show-ring winnings, and judging ability.

W. W. Yapp in his recent book, Dairy Cattle Judging and Selection (21) states "The essence of a successful 4-H dairy project is to develop the member, make him more competent in the area or field of the project, and thus enable him to act wisely in the presence of new and unusual situations with which in later life he may be confronted. This is brought about by his enlarged experiences, the widening of his acquaintances, by proper guidance, and through wholesome competition."

On a later page he says, "Every time a boy works with a calf he learns something new about animals. Day by day, as he feeds and cares for his animal, he observes its reaction to his care and management. Then when he undertakes to prepare the animal for exhibition, to clip, wash, trim feet and train it to lead and pose, he learns the techniques of the more successful exhibitors and herdsmen. All of these are developmental. The culmination is reached when he compares his achievements with those of others who like him are broadening their experiences and their understanding of the problems of life."

I fully agree with the statements of Dr. Yapp. However I do not agree with the suggestions of some that the culmination of the 4H member's development must be reached in the show ring or in dairy cattle judging. The member can compare his achievement with others through competition related to the care with which he kept growth, feed, production and cost records. He can compete in ability to express himself in public through contests involving demonstrations and other oral presentations related to management of dairy cattle. Let him prepare his animal for exhibit to learn the techniques of the advertising game of showing. However we should evaluate his exhibition primarily on his showmanship rather than the type of his animal. We all know that the type of the animal shown seldom reflects the skill of the member.

Let's make sure the awarding of ribbons or prizes or the eligibility to attend State and National competitions is based on the total evaluation of the member's project. If we conduct our 4H dairy programs in this manner, we will be evaluating the real end point of the training - the development of the member. Type, judging and the show ring can be kept in their proper perspective to the total needs of the dairying business. The member will complete his 4H training with a balanced knowledge of dairying rather than high specialization on the type aspects.

Frankly it might be well to eliminate judging team contests at the National and State levels. The publicity and recognition often given the member because of this single activity results in an extremely exaggerated concept of type's importance in dairying. The real educational value of judging can be obtained in local training. During this training the importance of type relative to other aspects of dairying should be taught.

It is gratifying that some of these needed changes in the 4H program are being made in several States. As other States undertake review and revision of their objectives, and particularly as these revisions reach the National level, certain problems of reorganizing the National competitions will arise. However, imagination and purposeful effort can resolve these problems and result in a competition which is more meaningful in terms of the 4H member's total achievement than it is today.

The economic pressures on the dairy industry demand a coldly realistic approach to the training of future dairymen. It is our obligation as leaders to review and revise our programs in accordance with existing research facts. It is my contention, and the conclusion of our group, that type, judging and the show ring presently receive more emphasis than the research facts justify. We believe the undue emphasis can be replaced with emphasis on the more useful aspects of dairying.

Literature Cited

1. Cunningham, L. C. 1957. North country dairy farms. Part I. Physical and financial operation of commercial dairy farms. Cornell Agri. Exp. Station A.E. 1084.
2. Curtiss, W. M. and Matzen, E. H. 1940. Marketing cull dairy cows in New York State. A. E. 310. Cornell Agr. Exp. Sta.
3. Freeman, A. E. and Dunbar, R. S. Jr. 1955. Genetic analysis of the components of type conformation and production in Ayrshire cows. Jour. Dairy Sci. 38:428.
4. Gilmore, L. O. 1952. Dairy cattle breeding. J. P. Lippincott Co. New York, N. Y.
5. Harvey, W. R. and Lush, J. L. 1952. Genetic correlation between type and production in Jersey cattle. Jour. Dairy Sci. 35:199.
6. Mitchell, R. G., Corley, E. L., Heizer, E. E. and Tyler, W. J. 1957. Heritability and phenotypic and genetic correlations between type ratings and milk and butterfat production in Holstein-Friesian cattle. Jour. Dairy Sci. 40:632.
7. Parker, J. B., Bayley, N. D., Fohrman, M. H. and Plowman, R. D. 1960. Factors influencing dairy cattle longevity. Jour. Dairy Sci. 43:401.
8. Petersen, E. E. 1953. Timing milk production for highest profit in the Detroit Milkshed. Mich. Agri. Exp. Sta. Spec. Bull. 386.
9. Plowman, R. D. and Gaalaas, R. F. 1960. Heritability estimates of longevity in Holstein-Friesian cattle. Paper presented at American Dairy Science Association Annual Meeting, Logan, Utah, June 22.

10. Prescott, M. S. 1959. The auction sale summary for 1958. Holstein-Friesian World 56:319.
11. Price, R. G. 1959. 11th McDonald Farms Sale. Guernsey Breeders Jour. 103:1147.
12. Rennie, J. C. 1951. Relation between type and production of Jersey cows in Canada. Sci. Agric. 31:553.
13. Rice, V. A., Andrews, F. N., Warwick, E. J., and Legates, J. E. 1957. Breeding and improvement of farm animals. 5th Ed. 537 pp.
14. Specht, L. W. and McGilliard, L. D. 1960. Rates of improvement by progeny testing in dairy herds of various sizes. Jour. Dairy Sci. 43:63.
15. Stone, J. B., Rennie, J. C. and Raithby, G. E. 1955. A type and production study of Holstein-Friesian cattle in Canada. Jour. Dairy Sci. 38:616.
16. Tabler, K. A. and Touchberry, R. W. 1955. Selection indices based on milk and fat yield, fat percent, and type classification. Jour. Dairy Sci. 38:1155.
17. Trimberger, G. W. 1960. Private communication.
18. Tyler, W. J., Corley, E. L. and Heizer, E. E. 1955. The association between milk and butterfat production and type ratings of Holstein-Friesian cows. J. Animal Sci. 14:1189.
19. Tyler, W. J. and Hyatt, George Jr. 1948. The heritability of official type ratings and the correlation between type ratings and butterfat production in Ayrshire cows. Jour. Dairy Sci. 31:63.
20. Wilcox, C. J., Pfau, K. O., Mather, R. E. and Bartlett, J. W. 1958. Effects of season, age and stage of lactation upon type ratings of Holstein cows. Jour. Dairy Sci. 41:1065.
21. Yapp, W. W. 1959. Dairy cattle judging and selection. John Wiley & Sons, Inc., New York, N. Y. 324 pp.
22. Young, C. W., Legates, J. E. and Leece, J. G. 1959. Genetic and phenotypic relationships between clinical mastitis, laboratory criteria and udder height. Jour. Dairy Sci. 43:1.

